

## IN THE CLAIMS

Please amend the claims as follows:

1. (currently amended) A ~~In a~~ method for producing a quartz glass jig, **said method**  
comprising: processing a quartz glass raw material into a desired shape by a treatment **inclusive**  
**of including** fire working, annealing so as to remove ~~for~~ stress **removal**, and cleaning  
treatment to obtain ~~the a~~ final product, ~~the method is characterized by that it comprises and~~  
performing a gas phase etching step and a gas phase purification step on a ~~the~~ surface layer of  
the quartz glass jig after **applying** the annealing ~~treatment for stress removal~~ but before the  
cleaning treatment, wherein the gas phase purification step is carried out continuously after the  
gas phase etching step.

2. (currently amended) A ~~In a~~ method for producing a quartz glass jig, **said method**  
comprising: processing a quartz glass raw material into a desired shape by a treatment **inclusive**  
**of including** fire working, annealing so as to remove ~~for~~ stress **removal**, and cleaning  
treatment to obtain ~~the a~~ final product, ~~the method is characterized by that it comprises and~~  
performing a gas phase etching step and a gas phase purification step on a ~~the~~ surface layer of  
the quartz jig after **applying** the annealing ~~treatment for stress removal~~ but before the  
cleaning treatment, wherein the gas phase purification step is carried out simultaneously with  
the gas phase etching step.

3. (currently amended) **A ~~In a~~ method for producing a quartz glass jig, said method** comprising: processing a quartz glass raw material into a desired shape by a treatment **inclusive of including** of fire working, annealing **so as to remove** ~~for stress removal~~, and cleaning treatment to obtain the final product, ~~the method is characterized by that it comprises~~ **and** performing **a** gas phase etching step and **a** gas phase purification step on **a** ~~the~~ surface layer of the quartz glass jig simultaneously with the annealing ~~treatment for stress removal~~, wherein the gas phase purification step is carried out continuously after the gas phase etching step.

4. (currently amended) **A ~~In a~~ method for producing a quartz glass jig, said method** comprising: processing a quartz glass raw material into a desired shape by a treatment **inclusive of including** fire working, annealing **so as to remove** ~~for stress removal~~, and cleaning treatment to obtain the final product, ~~the method is characterized by that it comprises~~ **and** performing **a** gas phase etching step and **a** gas phase purification step on **a** ~~the~~ surface layer of the quartz glass jig simultaneously with the annealing ~~treatment for stress removal~~, wherein the gas phase purification step is carried out simultaneously with the gas phase etching step.

5. (currently amended) A method for producing a quartz glass jig as claimed in **Claim 1** ~~one of Claims 1 to 4~~, wherein the gas phase etching step is performed in **a** ~~the~~ temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

6. (currently amended) A method for producing a quartz glass jig as claimed in Claim 5, wherein the ~~gas~~ **gaseous atmosphere** containing F is **contains** at least one ~~type gas~~ **gas** selected

from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ ,  $HF$ , and  $F_2$ .

7. (currently amended) A method for producing a quartz glass jig as claimed in **Claim 1** ~~one of Claims 1 to 6~~, wherein the gas phase purification step comprises performing high temperature heat treatment in ~~a~~ **the** temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

8. (currently amended) A method for producing a quartz glass jig as claimed in Claim 7, wherein the ~~gas~~ **gaseous atmosphere** containing Cl is  $HCl$ , ~~and/or~~  $Cl_2$ , **or a combination of  $HCl$  and  $Cl_2$** .

9. (currently amended) A method for producing a quartz glass jig as claimed in **Claim 5** ~~one of Claims 5 to 8~~, wherein the ~~gas~~ **gaseous** atmosphere containing F further includes a gas containing H.

10. (currently amended) A quartz glass jig produced by a method for producing quartz glass jigs as claimed in **Claim 1** ~~one of Claims 1 to 9~~, wherein the quartz glass raw material is naturally occurring quartz glass containing Li, Na, Mg, K, Fe, Cr, Ni, and Cu within a **depth** range from ~~a~~ surface **of the quartz glass raw material** to a depth of 100  $\mu m$ , each at ~~a~~ **respective concentration** ~~concentrations~~ less than 50 ppb.

11. (currently amended) A synthetic quartz glass jig produced by a method for producing quartz glass jig as claimed in Claim 1 ~~one of Claims 1 to 9~~, wherein the quartz glass raw material is synthetic quartz glass, said synthetic quartz glass ~~which contains~~ Li, Na, Mg, Al, K, Ca, Ti, Cr, Fe, Ni, and Cu within a depth range from a surface of the quartz glass raw material to a depth of 100  $\mu\text{m}$ , each at a respective concentration ~~concentrations~~ less than 50 ppb.

12. (new) A method for producing a quartz glass jig as claimed in Claim 2, wherein the gas phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

13. (new) A method for producing a quartz glass jig as claimed in Claim 12, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $\text{C}_x\text{F}_y$ ,  $\text{Cl}_x\text{F}_y$ ,  $\text{N}_x\text{F}_y$ ,  $\text{Si}_x\text{F}_y$ ,  $\text{S}_x\text{F}_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $\text{CHF}_3$ ,  $\text{HF}$ , and  $\text{F}_2$ .

14. (new) A method for producing a quartz glass jig as claimed in Claim 2, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

15. (new) A method for producing a quartz glass jig as claimed in Claim 14, wherein the gaseous atmosphere containing Cl is  $\text{HCl}$ ,  $\text{Cl}_2$ , or a combination of  $\text{HCl}$  and  $\text{Cl}_2$ .

16. (new) A method for producing a quartz glass jig as claimed in Claim 12, wherein the gas gaseous atmosphere containing F further includes a gas containing H.

17. (new) A method for producing a quartz glass jig as claimed in Claim 3, wherein the gas phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

18. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ ,  $HF$ , and  $F_2$ .

19. (new) A method for producing a quartz glass jig as claimed in Claim 3, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

20. (new) A method for producing a quartz glass jig as claimed in Claim 19, wherein the gaseous atmosphere containing Cl is HCl,  $Cl_2$ , or a combination of HCl and  $Cl_2$ .

21. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gas gaseous atmosphere containing F further includes a gas containing H.

22. (new) A method for producing a quartz glass jig as claimed in Claim 4, wherein the gas

phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

23. (new) A method for producing a quartz glass jig as claimed in Claim 22, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ ,  $HF$ , and  $F_2$ .

24. (new) A method for producing a quartz glass jig as claimed in Claim 4, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

25. (new) A method for producing a quartz glass jig as claimed in Claim 24, wherein the gaseous atmosphere containing Cl is  $HCl$ ,  $Cl_2$ , or a combination of  $HCl$  and  $Cl_2$ .

26. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gas gaseous atmosphere containing F further includes a gas containing H.